

Abstract for:

Solar and Space Physics and the Vision for Space Exploration
October 16-20, 2005
Wintergreen, VA

Presenting author:

Jonathan Krall
Naval Research Laboratory
Plasma Physics Division
Code 6794
4555 Overlook Ave., SW
Washington, DC 20375-5346
(202) 404 7719
jonathan.krall@nrl.navy.mil

Authors: J. Krall[1], V. Yurchyshyn[2], O. C. St Cyr[3,4] and J. Chen[1]

Affiliation: [1] Plasma Physics Division, Naval Research Laboratory,
Code 6790, Washington, DC 20375-5346
[2] Big Bear Solar Observatory, New Jersey Institute of Technology, Big Bear City, CA 92314
[3] Solar Physics Branch, NASA-Goddard Space Flight Center, Greenbelt, Maryland 20771
[4] Department of Physics, The Catholic University of America, Washington, D.C. 20064

Type of presentation: poster

Working Group: C (Propagation of Events in Progress)

Title: Three-Dimensional Geometry of the Flux-Rope Drivers of SEP Events*

Abstract: The dynamics of shock-driven solar-energetic particle (SEP) events depend on the three-dimensional (3D) geometry of the erupting magnetic structures that drive these events. Based on observations, we have determined the geometry of a typical flux-rope CME, which is parameterized in terms of overall size, axial aspect ratio, and the eccentricity of the ellipse formed by the curved axis of the flux rope. Further, we have found that the near-Sun magnetic configuration, as obtained from a match of the model geometry to observed halo-CME morphologies for specific events, is closely related to the “interplanetary CME” (ICME) magnetic configuration, as determined by matching the model ICME to the corresponding *in situ* magnetic field and plasma measurements; this association gives us confidence in our 3D CME model. Our present tools are a) an erupting flux-rope code that models a CME/ICME from Sun to Earth and b) a 3D CME generator that produces 3D CME fields and densities, synthetic coronagraphs, etc., for specified geometrical parameters. We will discuss how these tools might be applied to SEP event modeling.

*Work supported by ONR and NASA